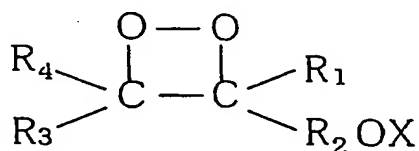


# CLAIMS

1. A chemiluminescence enhancer used for signal  
detection in solid phase immunoassay using antigen or/and  
5 antibody immobilized on a fine solid carrier dispersible  
in liquid medium, consisting of a water soluble  
macromolecular quaternary ammonium salt, a quaternary  
sulfonium salt or a phosphonium salt for enhancing  
emission of light caused by enzymatic reaction of a  
10 chemiluminescent substrate having dioxetane, wherein  
aggregation inhibition treatment of the fine solid  
carriers is given by treating with an oxidizing agent or a  
reducing agent.
2. The chemiluminescence enhancer according to claim 1  
15 wherein the enhancer does not substantially comprise a  
component with a molecular weight of more than 400,000  
daltons in the molecular weights separated by an  
ultrafiltration method.
3. The chemiluminescence enhancer according to claim 1  
20 or 2 wherein the chemiluminescent substrate is a substrate  
represented by general formula:



- wherein R<sub>2</sub> is an aryl group substituted with an X-oxy  
25 group, which forms 1,2-dioxetane compound which is an  
unstable oxide intermediate when X is eliminated by  
activator selected from acid, base, enzyme, organic or  
inorganic catalyst and electron donor to induce a reaction,  
which unstable 1,2-dioxetane compound is decomposed with  
30 releasing electron energy to produce light and two  
carbonyl-containing compounds of general formulae,



and X is a chemically easily reactive group which is eliminated by an enzyme; R<sub>1</sub> is one selected from the group consisting of an alkyl group, an alkoxy group, an aryloxy group, a dialkylamino group, a trialkylsilyloxy group, an arylsilyloxy group, an aryl group and an aryl group which is bound to an aryl group R<sub>2</sub> to form a polycyclic aryl group with X-oxy group substitution, which spiro-binds to a 1,2-dioxetane ring; R<sub>3</sub> and R<sub>4</sub> are each an alkyl group or a heteroalkyl group, or R<sub>3</sub> and R<sub>4</sub> may be together bound to form a polycyclic alkylene group which spiro-binds to the 1,2-dioxetane ring.

4. The chemiluminescence enhancer according to any one of claims 1 to 3 wherein the enhancer is prepared from a monomer selected from the group consisting of a quaternary ammonium salt, a quaternary sulfonium salt, a quaternary phosphonium salt and mixtures thereof.

5. The chemiluminescence enhancer according to any one of claims 1 to 3 wherein the enhancer is a polymerized quaternary ammonium salt, a polymerized quaternary sulfonium salt, a polymerized quaternary phosphonium salt or copolymers thereof.

6. The chemiluminescence enhancer according to any one of claims 1 to 3 wherein the enhancer is selected from the group consisting of poly[vinylbenzyl(benzylmethyl ammonium chloride)], poly(vinylbenzyltrimethyl ammonium chloride), poly[vinylbenzyl(tributyl ammonium chloride)], benzylmethylcetyl ammonium chloride, polymethacrylamidepropylenemethyl ammonium chloride, poly[vinylbenzyl(triethyl ammonium chloride)], poly[vinylbenzyl(2-benzylamino)ethyldimethyl ammonium chloride], poly[vinylbenzyl(dimethyl(2-hydroxy)ethyl ammonium chloride)], poly[vinylbenzyl(trimethylphosphonium chloride)], poly[vinylbenzyl(tributylphosphonium chloride]

and poly[vinylbenzyl(trioctylphosphonium chloride)] and copolymers thereof.

7. The chemiluminescence enhancer according to any one of claims 1 to 6 wherein the solid carrier is a particle.

5 8. The chemiluminescence enhancer according to claim 7 wherein the particle is a magnetic particle.

9. The chemiluminescence enhancer according to any one of claims 1 to 8 wherein the reagent having oxidation or reduction property is selected from the group consisting  
10 of ammonium persulfate, sodium sulfite, sodium hypochlorite, hydrogen peroxide, sodium metaperiodate, potassium permanganate and potassium dichromate.

10. A chemiluminescence method of reacting acid phosphatase, alkali phosphatase, glucosidase,  
15 glucuronidase or esterase as an enzyme of a labeled body in the presence of a chemiluminescence enhancer in a solid phase immunoassay using an antigen or/and an antibody immobilized onto fine solid carriers dispersible in a liquid medium, wherein the chemiluminescence enhancer is  
20 the chemiluminescence enhancer defined in any one of claims 1 to 9.

11. The chemiluminescence method according to claim 10 which is the chemiluminescence method of the immunoassay using particles in the presence of the chemiluminescence  
25 enhancer, wherein the chemiluminescence enhancer is the chemiluminescence enhancer defined in any one of claims 1 to 7 and 9.

12. The chemiluminescence method according to claim 10 or 11 which is the chemiluminescence method of the  
30 immunoassay using magnetic particles in the presence of the chemiluminescence enhancer, wherein the chemiluminescence enhancer is the chemiluminescence enhancer defined in any one of claims 1 to 6, 8 and 9.

13. A detection reagent kit used for a detection system  
35 in a solid phase immunoassay using an antigen or/and an antibody immobilized onto fine solid carriers dispersible .

in a liquid medium, based on chemiluminescence by an enzymatic reaction of a chemiluminescent substrate having dioxetane, and comprising the chemiluminescent substrate having dioxetane, and the enhancer according to any one of  
5 claims 1 to 9.

14. The reagent kit according to claim 13 for an immunoassay using particles, comprising a chemiluminescent substrate having dioxetane, and the enhancer according to any one of claims 1 to 9.

10 15. The reagent kit according to claim 13 or 14 for an immunoassay using magnetic particles, comprising the chemiluminescent substrate having dioxetane, and the enhancer according to any one of claims 1 to 9.